

Homework Day 6 Quiz Review

Determine the following for the given function (#1-20). $f(x) = \frac{x^3 + 64}{x^2 - 16} = \frac{(x+4)(x^2 - 4x + 16)}{(x+4)(x-4)}$

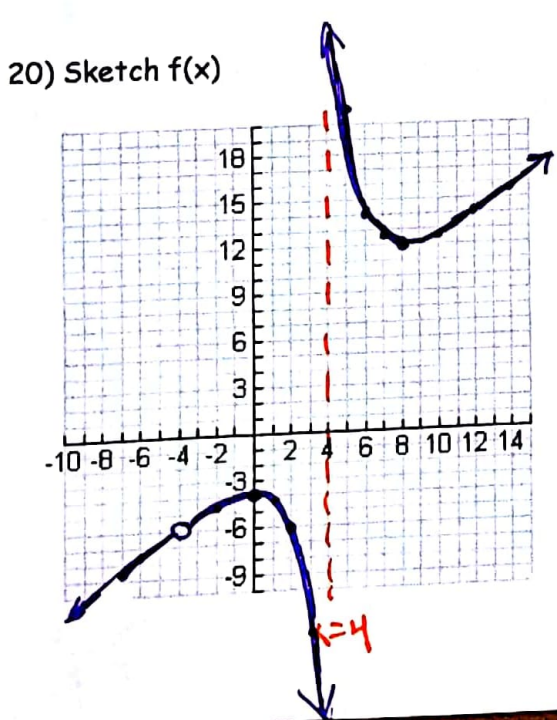
- 1) Domain: $(-\infty, -4) \cup (-4, 4) \cup (4, \infty)$
- 2) Range: $(-\infty, -4] \cup [12, \infty)$
- 3) removable point of discontinuity: $(-4, -6)$
- 4) Increasing: $(-\infty, -4) \cup (-4, 0] \cup [8, \infty)$
- 5) Decreasing: $[0, 4) \cup (4, 8]$
- 6) Local Min: 12 at $x=8$
- 7) Local Max: -4 occurs at $x=0$
- 8) x-intercept(s): none
- 9) y-intercept(s): $(0, -4)$
- 10) vertical asymptotes: $x=4$
- 11) horizontal asymptotes: none
- 12) Continuous? No (have VA and hole)
- 13) Nonremovable discontinuity? Yes. VA at $x=4$
- 14) $\lim_{x \rightarrow \infty} f(x) = \infty$
- 15) $\lim_{x \rightarrow -\infty} f(x) = -\infty$
- 16) $\lim_{x \rightarrow 4^-} f(x) = -\infty$
- 17) $\lim_{x \rightarrow 4^+} f(x) = \infty$
- 18) $\lim_{x \rightarrow 4} f(x)$ DNE (Does Not Exist) (because limit is different at $x=4$ coming from left hand side vs right hand side)
- 19) $\lim_{x \rightarrow -4} f(x) = -6$

$y = \frac{x^2 - 4x + 16}{x - 4}$
left over equation

$y = \frac{(-4)^2 - 4(-4) + 16}{-4 - 4} = \frac{48}{-8} = -6$ use left over equation

(,) NOT bracket because VA at $x=4$ (can't touch that x-value or you'd be doing \div by 0)

* bracket because hit the local max at $x=0$



- 20) Sketch $f(x)$
- 21) Given: $\sqrt{2x^2 + 11x + 14}$
Find Domain (no decimals): $(-\infty, -3.5] \cup [-2, \infty)$
Find Range: $[0, \infty)$ *x's in middle give $\sqrt{-\#}$
- 22) Given: $\frac{\sqrt{x+2}}{x-3}$
Find Domain: $[-2, 3) \cup (3, \infty)$ VA: $x=3$ HA: $y=0$
Find Range: $(-\infty, \infty)$ Do NOT skip HA $y=0$ here b/c have x-int

